Energy Control for Research Sterilizer

Overview

Purpose

The intended use of this procedure is to describe the method for effectively locking and tagging the multiple hazardous energy sources. Only lock out / tag out trained employees are authorized to perform this work.

Scope

This document applies to equipment types as described within this procedure located at Boston Scientific Maple Grove or Plymouth Campuses with the following equipment located in the Research Sterilizer area:

BSC ID/IQR#	Equipment Description	BSC ID/IQR#	Equipment Description
90005830	AAT Controls	90006155	Vacuum
90005835	Damper Controls	90006159	Aeration Chamber # 1
90005883	Safe Cell 2	90006180	Aeration Chamber # 2
90005938	Safe Cell 1	90006184	Scale 1, 100% EO
90005943	Exhaust Blower	90006188	Scale 2, Oxyfume
90005949	EO Monitor 100%	90006192	Recirculation Blower
90006063	EO Monitor Oxyfume	90006196	RO Water
90006086	Steam Boiler	90006201	Clean Steam
90006091	Sterilizer Controls	90006205	Vaporizer
90006095	Chamber	90006214	PLC
90006108	Booster Pump	90006220	WonderWare
90006145	Heat Exchangers	90006226	Panelview
90006149	Vented Cabinet		

Applicable Documents

See the table below for documents referenced in this procedure:

Document Name	Document Number
Lock out / Tag out	90002763
Research Sterilizer Operation	90032956
Research Sterilizer Preventive Maintenance	90042073

Overview - continued

Equipment & Materials

See the table below for equipment and materials referenced in this procedure:

Description	Part Number
Red locks or red banded locks	N/A
Red and white striped “Danger” tags	N/A
Lock out hasps	N/A
Electrical cord plug lock out	N/A
Electrical switch lock out	N/A
Ball valve lock out	N/A
Butterfly valve lock out	N/A

Definitions

The following terms are used in this procedure:

Term	Definition
Energy isolating device	A device that physically prevents the release or transmission of energy.
Hazardous energy	Energy, which if not controlled, could cause injury or death including but not limited to: electrical, chemical, mechanical, hydraulic/ pneumatic, or thermal.
Lockout device	A device that utilizes a positive means to hold an energy isolating device in a safe position.
Lock out hasp	Used to affix multiple locks to an energy isolating device.

Procedure

Energy Control Procedure

Complete the following steps for complete de-energization of this equipment.

Step	Action
1	Notify all affected personnel and confirm personnel are clear of hazards.
2	Turn off power at disconnect points listed below.
3	Lock out each energy control point listed below in the off position by affixing an approved lock and tag to a lockout device.
4	Dissipate/disconnect any stored energy.
5	Attempt to re-start machinery or re-energize equipment through normal means.
6	Perform required work.

Temporary Removal

Temporary removal of lock out / tag out devices is allowed for testing or positioning of machines or equipment provided that all steps for application and removal of lock out / tag out devices are followed and that the machinery or equipment is returned to the original, de-energized condition prior to continuing work.

<table>
<tr><th>Energy Source</th><th>Location to Lock Out</th><th>Method to Lock Out</th><th>How to Confirm Effective Lock Out</th></tr>
<tr>
<td>Electrical (E)
  </td>
<td>Sterilizer main electrical disconnect is located in control room on door to enclosure #1. (E-1)

This switch controls 3-phase electric supply to pumps and motors for the following components of the Research Sterilizer system:

<table>
<tr><th>BSC ID/IQR#</th><th>Description</th></tr>
<tr><td>90006095</td><td>Chamber</td></tr>
<tr><td>90006108</td><td>Booster Pump</td></tr>
<tr><td>90006155</td><td>Vacuum</td></tr>
<tr><td>90006159</td><td>Aeration Chamber # 1</td></tr>
<tr><td>90006180</td><td>Aeration Chamber # 2</td></tr>
<tr><td>90006192</td><td>Recirculation Blower</td></tr>
</table>
</td>
<td>Turn switch to “off” position and use switch lock out device or individual circuit breaker may be locked off.

<u>NOTE</u>: 24V DC service is maintained by the UPS (SE-1) for the PLC, Compressed Air Control and sensors in the following components of the Research Sterilizer system.

<table>
<tr><th>BSC ID/IQR#</th><th>Description</th></tr>
<tr><td>90005949</td><td>EO Monitor 100%</td></tr>
<tr><td>90006063</td><td>EO Monitor Oxyfume</td></tr>
<tr><td>90006091</td><td>Sterilizer Controls</td></tr>
<tr><td>90006095</td><td>Chamber</td></tr>
<tr><td>90006149</td><td>Vented Cabinet</td></tr>
<tr><td>90006184</td><td>Scale 1, 100% EO</td></tr>
<tr><td>90006188</td><td>Scale 2, Oxyfume</td></tr>
<tr><td>90006214</td><td>PLC</td></tr>
<tr><td>90006220</td><td>WonderWare</td></tr>
<tr><td>90006226</td><td>Panelview</td></tr>
</table>
</td>
<td>Attempt to re-start – no action should occur.</td>
</tr>
</table>

<table>
<tr><th>Energy Source (Cont'd)</th><th>Location to Lock Out</th><th>Method to Lock Out</th><th>How to Confirm Effective Lock Out</th></tr>
<tr><td>Electrical (E)
  </td><td>Emissions main disconnect is located in control room on emissions control panel. (E-2)

This controls the following components of the emissions control system including the roof-top exhaust.

<table><tr><th>BSC ID/IQR#</th><th>Description</th></tr><tr><td>90005830</td><td>AAT Controls</td></tr><tr><td>90005835</td><td>Damper Controls</td></tr><tr><td>90005883</td><td>Safe Cell 2</td></tr><tr><td>90005938</td><td>Safe Cell 1</td></tr><tr><td>90005943</td><td>Exhaust Blower</td></tr><tr><td>90006210</td><td>Water Processor</td></tr></table></td><td>Turn switch to "off" position and use switch lock out device or individual circuit breaker may be locked off.</td><td>Attempt to re-start – no action should occur.</td></tr>
<tr><td>Mechanical (M)
  </td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

<table>
<tr><th>Energy Source (Cont'd)</th><th>Location to Lock Out</th><th>Method to Lock Out</th><th>How to Confirm Effective Lock Out</th></tr>
<tr><td rowspan="2">Chemical (C)
  </td><td>Ethylene Oxide resides within the EO cabinet. (C-1)</td><td>Tank valve can be closed and secured with a clamshell lock.

<u>Caution,</u> EO will remain in lines to main control valves.</td><td>N/A</td></tr>
<tr><td>Sulfuric acid resides in safe-cell #1 to the left of the sterilizer on the floor. (C-2)</td><td>Acid circulation is ceased by isolating main sterilizer electrical disconnect.

Acid can be isolated by closing ball valve and applying ball valve lock out.</td><td>Attempt to re-start – no action should occur..</td></tr>
<tr><td>Stored Energy (SE)
  </td><td>UPS for 24V DC service is located in control room on top of enclosure #1. (SE-1)

This controls 24V DC service for the PLC, Compressed Air Control and sensors in the following components of the Research Sterilizer system.

<table><tr><th>BSC ID/IQR#</th><th>Description</th></tr><tr><td>90005949</td><td>EO Monitor 100%</td></tr><tr><td>90006063</td><td>EO Monitor Oxyfume</td></tr><tr><td>90006091</td><td>Sterilizer Controls</td></tr><tr><td>90006095</td><td>Chamber</td></tr><tr><td>90006149</td><td>Vented Cabinet</td></tr><tr><td>90006184</td><td>Scale 1, 100% EO</td></tr><tr><td>90006188</td><td>Scale 2, Oxyfume</td></tr><tr><td>90006214</td><td>PLC</td></tr><tr><td>90006220</td><td>WonderWare</td></tr><tr><td>90006226</td><td>Panelview</td></tr></table></td><td>UPS power cord can be removed and plug lock applied</td><td>Attempt to re-start – no action should occur.</td></tr>
</table>

Energy Source (Cont'd)	Location to Lock Out	Method to Lock Out	How to Confirm Effective Lock Out
Pneumatic / Hydraulic (PH) 	Main compressed air is located in control room above enclosure #4. (PH-1)	Pressure regulator is closed and clamshell lock applied. Lines can be bled if necessary	No pressure present on gage.
	Compressed air for emissions control system is located in control room above emission enclosure (PH-2)		
	Main nitrogen valve is located in sterilizer room above door to gas storage area. (PH-3)	Ball valve is closed and ball valve lock applied. Lines can be bled if necessary.	No pressure present on gage.
	Gas chromatograph tanks are located in boiler room by RO mini-loop (PH-4)	Close tank valves and apply clamshell lock.	
	RO Water shutoff is located on the wall behind the RO system. (PH-5)	Ball valve is closed and ball valve lock applied.	N/A
	RO electrical disconnect is located on the wall behind the RO system. (PH-6)	Turn switch to "off" position and use switch lock out device.	Attempt to re-start – no action should occur.
	Chiller heat exchange fluid shutoff is located on the wall at the rear of the sterilization chamber. (PH-7)	Ball valve is closed and ball valve lock applied.	N/A
	Main soft water supply shutoff (serving everything except the boiler) is located near the ceiling of the sterilizer room. (PH-8)		
	Boiler soft water supply shutoff is located near the ceiling of the sterilizer room. (PH-9)		

<table>
<tr><th>Energy Source (Cont'd)</th><th>Location to Lock Out</th><th>Method to Lock Out</th><th>How to Confirm Effective Lock Out</th></tr>
<tr>
<td>Thermal (T)
  </td>
<td>Main boiler is located in boiler room to the side of the sterilizer. It provides steam to:

<table>
<tr><th>BSC ID/IQR#</th><th>Description</th></tr>
<tr><td>90006086</td><td>Steam Boiler</td></tr>
<tr><td>90006095</td><td>Chamber*</td></tr>
<tr><td>90006145</td><td>Heat Exchangers</td></tr>
<tr><td>90006159</td><td>Aeration Chamber # 1</td></tr>
<tr><td>90006180</td><td>Aeration Chamber # 2</td></tr>
<tr><td>90006201</td><td>Clean Steam</td></tr>
<tr><td>90006205</td><td>Vaporizer</td></tr>
</table>

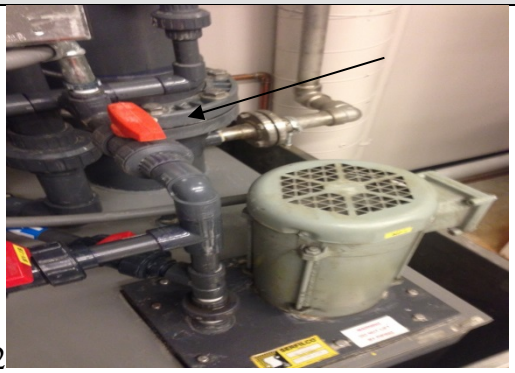
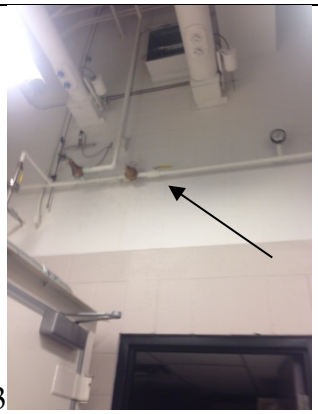
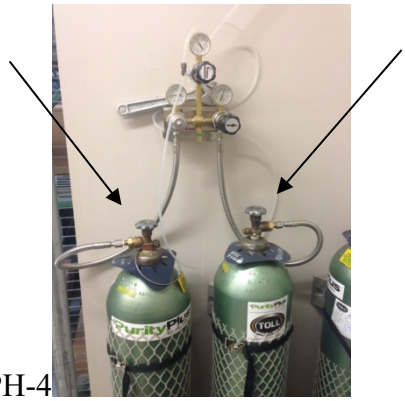
Main electrical disconnect is located on the wall to the left of the boiler. (T-1)

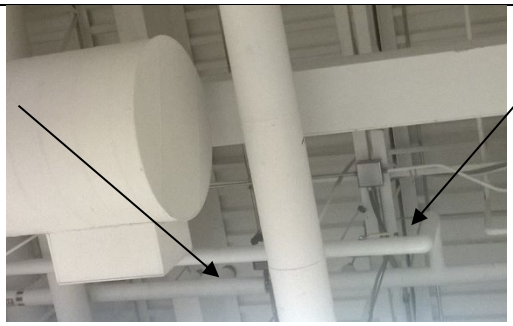
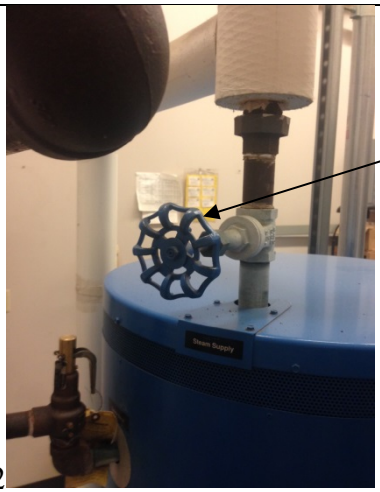
Main liquid valve is located on top of boiler. (T-2)

Condensate return pump electrical disconnect is on the wall to behind the condensate pump and next to the RO system. (T-3)

*NOTE: Steam for the chamber is produced by 90006201 which uses 90006086 as its heat source. Shutting down 90006086 will stop clean steam production.</td>
<td>Turn switch to "off" position and use switch lock out device.

Close main liquid valve and secure with clamshell lock.</td>
<td>Attempt to re-start – no action should occur.</td>
</tr>
</table>

Energy Control Location Photos	
C-1 	C-2 
E-1 	E-2 
PH-1 	PH-2 
PH-3 	PH-4 

Energy Control Location Photos (cont'd)	
PH-5 	PH-6 
PH-7 	 PH-8 (left) and PH-9 (right)
SE-1 	T-1 
T-2 	T-3 

Procedure to Return Tool to Operation

Complete the following steps for complete re-energization of this equipment.

Step	Action
1	Inspect the work area to ensure that all non-essential items, tools, or employees have been removed from the area.
2	Unlock and remove any blocking devices.
3	Reposition any safety guards.
4	Warn workers to stay clear of area.
5	Remove all locks and tags from energy control points.
6	Confirm that the area is clear of personnel.
7	Re-start the equipment.
8	Notify all affected personnel that the lockout has been cleared.

Normal Operation Adjustments

Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, do not require lock out if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection. The following apply to this procedure:

Operation	Alternate Method of Protection
Preventive Maintenance	Follow instructions in 90042073.
EO Cylinder Change	Follow instructions in 90032956.